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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,208	02/22/2002	Ken Kobayashi	07553.0028	7671

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EXAMINER

ALANKO, ANITA KAREN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 12/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/069,208	Applicant(s) KOBAYASHI ET AL.	
	Examiner Anita K Alanko	Art Unit 1765	

-- Th MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/29/03 and 11/18/03 amdt.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robb (US 4,529,860) in view of admitted prior art.

Robb discloses a method of etching an organic film (polyimide) on a workpiece (silicon substrate) (Example V, which incorporates Example I, col.6, lines 27-61 and col.4, lines 7+, respectively), the organic film having an etching mask (hard mask layer of silicon nitride or silicon oxide), the method comprising:

placing the workpiece in a hermetically sealed process chamber 38;

introducing processing gas comprising a gas comprising nitrogen atoms and a gas comprising hydrogen atoms into the process chamber ("mixed hydrogen-nitrogen plasma" or Example V); and

etching the organic film (the anisotropic etch of Example V).

Robb does not explicitly recite that the etch is stopped before the etching goes through the organic film. However, Robb does teach that the etch can be conducted to a "predetermined amount" (col.2, lines 52-54). Admitted prior art teaches that it is useful to stop the etch before the etch goes through the film (page 1, lines 25-28) It would have been obvious to one with ordinary skill in the art to stop the etch before the etching goes through the film in the method of

Robb because Robb teaches to etch a predetermined amount and admitted prior art teaches it is useful to etch part-way through the layer.

As to claims 7-9, 11, 13-15, Robb discloses that the etch gas comprises nitrogen, hydrogen and argon (Example V and VI). It would have been obvious to one with ordinary skill in the art to add argon in the modified method of Robb because it is a conventional diluent for etch compositions as taught by Robb.

As to claim 10, Robb discloses to etch at 150 mTorr (20 Pa, Example V), and also teaches that a range of up to 500mTorr (66.5 Pa, col.1, lines 26-28) is known. Robb also teaches that high pressure etching of polyimide is also known (col.1, lines 21-22), which presumably encompasses pressures greater than 500 mTorr, however at higher pressures later etching becomes more pronounced. Robb therefore teaches that the pressure is a result effective variable. It would have been obvious to one with ordinary skill in the art to etch at 500 mTorr or higher in the modified method of Robb because the pressure appears to reflect a result-effective variable which can be optimized. See MPEP 2144.05 IIB.

As to claim 12, it would have been obvious to one with ordinary skill in the art to etch at 500-800 mTorr in the modified method of Robb because the pressure appears to reflect a result-effective variable which can be optimized. See MPEP 2144.05 IIB

As to claims 16-21, admitted prior art (page 1, lines 25+) teaches that the damascence structure is a conventional structure. It would have been obvious to apply the method of Robb to a damascene structure because it is a conventional structure in microelectronics.

Response to Amendment

The rejections of claims 6-9 under 35 U.S.C. 102(a) as being clearly anticipated by JP 2000-036484 and of claims 6-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robb (US 4,529,860) are withdrawn.

Claims 6-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robb (US 4,529,860) in view of admitted prior art.

Response to Arguments

Applicant's arguments filed on 9/29/03 have been fully considered but they are not persuasive. Applicant argues that 498 mTorr is not equal to or higher than 500, however when taken to one significant digit, 498 mTorr is about 500 mTorr.

Applicant argues that the pressure is not a result-effective variable. This is not persuasive because Robb discloses to vary the pressure. Varying pressure varies the results; Robb discusses the extent of undercut as one result.

Admitted prior art teaches that stopping the etch before the etch goes through the film is known.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K Alanko whose telephone number is 571-272-1458. The examiner can normally be reached on Mon,Tues & Fri: 8:30 am-5 pm; Wed&Thurs:10 am-2 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Anita K Alanko
Primary Examiner
Art Unit 1765